73rd MORSS CD Cover Page

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Quick Automated Tool For Optimization (QATO)

Mr Danny Mellott
Mr John Tindle

Agenda

- Capabilities
- What is QATO?
- How the Tools Interact
- Additional Capability
- Conclusion

Capabilities of QATO

- **QATO provides a quick comparison of roadmaps (architectures) by:**
  - **Task Effectiveness by year**
  - **Total Roadmap cost by fiscal year to budget authority**
  - **Roadmap cost by different budgets by fiscal year**
- **QATO provides the ability to modify a given roadmap**
  - **By turning systems on or off**
  - **Changing start/IOC/FOC/stop dates**
  - **By changing the budget authority**

QATO provides the ability to support decision making quickly…

What is QATO?

- **QATO is an Excel-based suite of tools developed to visually depict , modify, and conduct comparison of roadmaps by task effectiveness and cost**
- **QATO consists of three automated workbooks**
  - **QATO 2.2**
  - **QATO Compare**
  - **QATO Additional Calculations**

What is QATO? (continued)

- **QATO 2.2 is the heart of the QATO suite**
  - **Menu: The Menu sheet has links to the rest of QATO Sheets**
  - **Systems: Consists of list of systems (and their Unique IDs) to include budget ID, force size, Start Funding, IOC, FOC, Stop, and unique Ids that refer to Cost and Deployment sheets**
  - **Tasks: List of tasks (up to 2000) and their unique Ids**
  - **Budget: List of budgets**

What is QATO? (continued)

- **Costs: 25 year life cycle cost by system**
- **Deployment Schedule: This sheet shows how long it would take to deploy a system from start funding to FOC, and the representative score it receives during deployment**
- **Scores: This sheet(s) has two parts, a score matrix which lists the systems, tasks and reference to score tables; and the score tables which are based upon the deployment schedule and task effectiveness scores**

What is QATO? (continued)

- **Output: The Output sheet is generated each time the Run QATO button is pushed. It consists of two sections:**
  - **An abbreviated budget section which consists of the different budgets, roadmap costs and an over/under budget comparison for each budget and total budget**
  - **The effectiveness score of the roadmap, listed by task and each system that contributes to that task effectiveness along with a summed task effectiveness task row for that task**

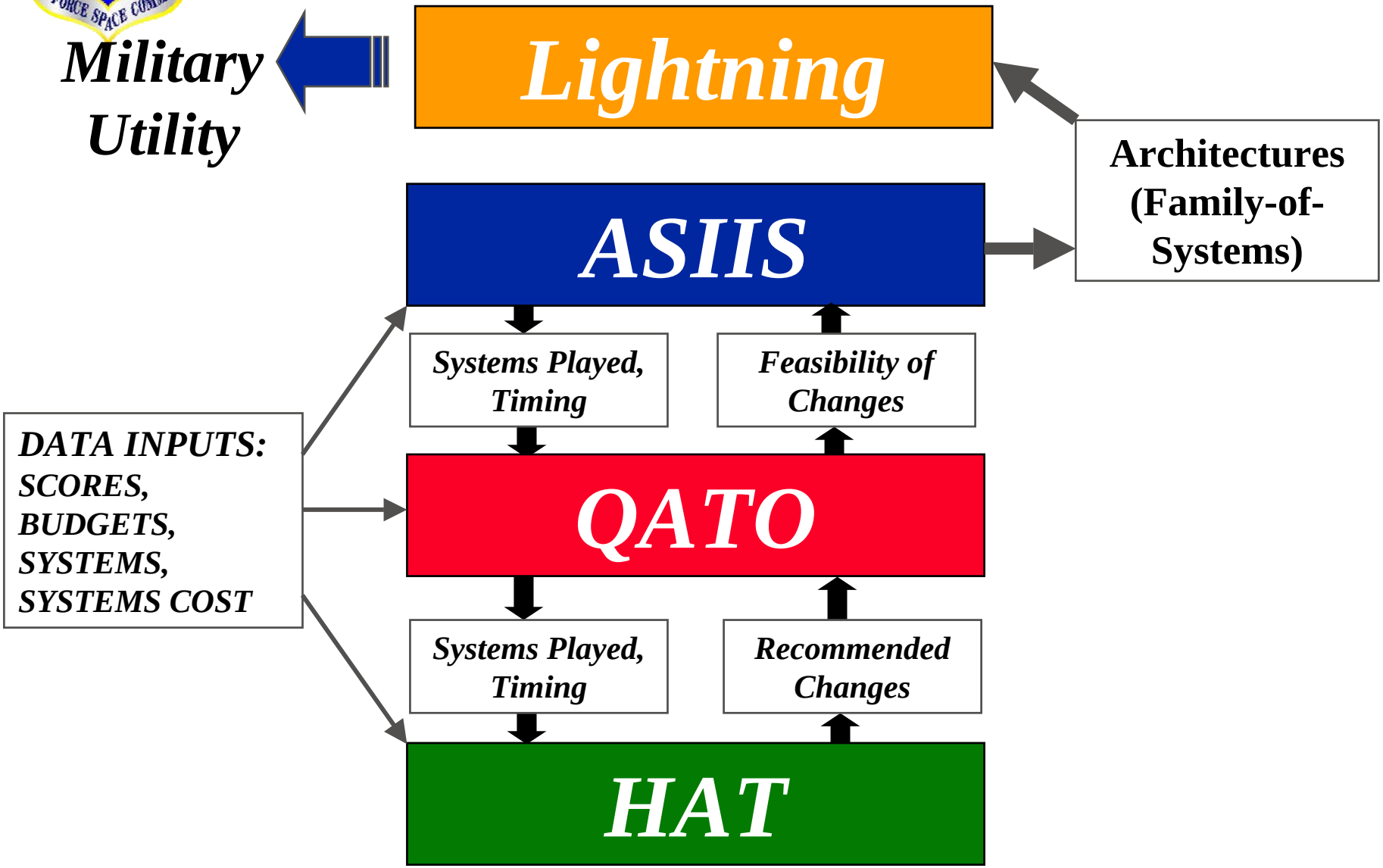
What is QATO? (continued)

- **Budget Output: This Output sheet is also generated each time the Run QATO button is pushed. It consists of:**
  - **A detailed listing for each budget by system and their cost by FY**
  - **An over/under budget comparison for each budget and total budget**

What is QATO? (continued)

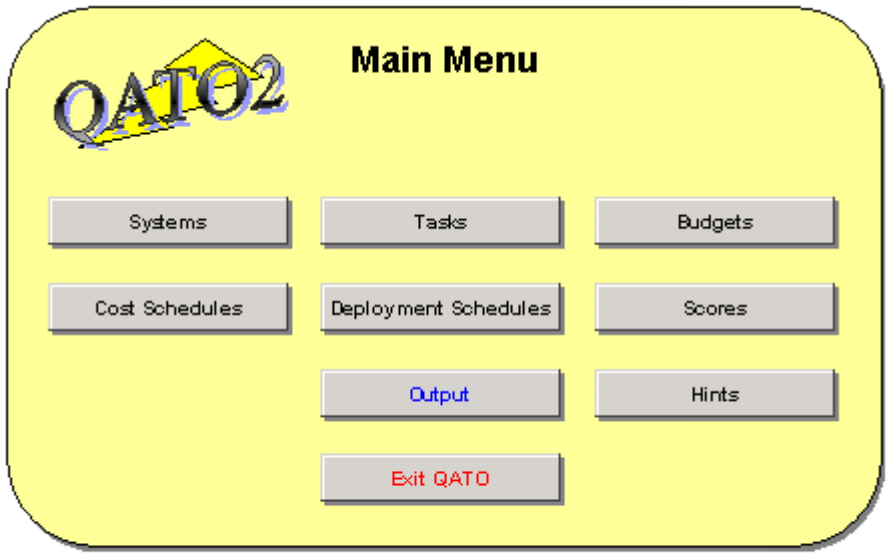
- **QATO can be used in conjunction with ASIIS and HAT**
  - **Inputs for scores, budgets and system costs same as ASIIS inputs**
  - **Inputs for systems played and timing lifted directly from ASIIS output**
  - **QATO/ASIIS output fed directly to HAT for cost/benefit analysis**
  - **HAT results cycled back to QATO to test feasibility of architecture modifications based on Pareto analysis**

How the Tools Interact



QATO2

QATO Main Menu Tab



QATO 2.2

Quick Automated Tool for Optimization

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QATO Systems Tab

Run QATO | Back to Main Menu

ID	System #	Include	Nomenclature	Type	Budget ID	Force	Start	IOC	FOC	Stop	Cschedule ID	Dschedule ID	TRL
A	System 1	1	AA001	A	B1	2	2006	2006	2006	2015	CA	DA	9
B	System 2	1	AA002	A	B1	7	2006	2010	2013	2030	CB	DB	9
C	System 3	1	AA003	A	B2	6	2011	2017	2019	2030	CC	DC	7
D	System 4	1	AA004	A	B2	10	2006	2006	2006	2030	CD	DA	9
E	System 5	1	AA005	A	B2	6	2011	2014	2020	2030	CE	DD	7
F	System 6	1	AA006	A	B2	6	2012	2015	2018	2030	CF	DE	7
F1	System 6A	1	A006M1	A	B2	6	2014	2016	2019	2030	CFM	DF	7
F2	System 6B	1	A006M2	A	B2	6	2026	2028	2031	2041	CFM	DF	7
G	System 7	1	AA07	A	B2	5	2006	2010	2011	2016	CG	DG	9
G1	System 7A	1	AA007M1	A	B2	5	2014	2015	2016	2030	CGM	DH	9
H	System 8	1	AA008	A	B1	1	2006	2010	2010	2016	CH	DI	9
I	System 9	1	AA009	B	B1	2	2006	2009	2009	2016	CI	DJ	9
J	System 10	1	AA010	B	B1	1	2006	2010	2010	2020	CJ	DI	9
K	System 11	1	AA011	B	B2	500	2010	2012	2013	2030	CK	DK	8
L	System 12	1	AA012	B	B2	1	2013	2020	2021	2030	CL	DL	7
M	System 13	1	AA013	A	B2	3	2006	2007	2009	2030	CM	DM	9
M1	System 13A	1	AA013M1	A	B2	3	2012	2012	2014	2030	CMM	DN	9
M2	System 13B	1	AA013M2	A	B2	3	2013	2013	2015	2030	CMM	DN	9
N	System 14	1	AA014	A	B2	25	2012	2013	2017	2030	CN	DO	7
N1	System 14A	1	AA014M1	A	B2	25	2016	2017	2019	2030	CNM	DO	7
N2	System 14B	1	AA014M2	A	B2	25	2020	2021	2023	2030	CNM	DO	7
O	System 15	1	AA015	B	B2	50000	2010	2011	2013	2030	CO	DP	8
O1	System 15A	1	AA015M1	B	B2	50000	2014	2015	2015	2030	COM	DQ	8
O2	System 15B	1	AA015M2	B	B2	50000	2014	2015	2015	2030	COM	DQ	8
P	System 16	1	AA016	A	B1	8	2006	2010	2015	2030	CP	DR	9
Q	System 17	1	AA017	A	B1	10	2010	2014	2019	2030	CQ	DS	8
R	System 18	1	AA018	A	B1	10	2014	2018	2023	2030	CR	DS	6
S	System 19	1	AA019	A	B1	3	2018	2022	2027	2030	CS	DT	5
T	System 20	1	AA020	A	B1	10	2022	2026	2031	2036	CT	DS	4
U	System 21	1	AA021	A	B1	10	2026	2030	2035	2045	CU	DS	3
V	System 22	1	AA022	A	B2	4	2012	2015	2017	2030	CV	DU	7
W	System 23	1	AA023	B	B2	1	2007	2011	2012	2030	CW	DV	9
X	System 24	1	AA024	B	B2	30	2013	2015	2021	2031	CX	DW	7
X1	System 24A	1	AA024M1	B	B2	30	2019	2022	2024	2034	CXM	DX	7
X2	System 24B	1	AA024M2	B	B2	30	2022	2025	2027	2037	CXM	DX	7
X3	System 24C	1	AA024M3	B	B2	30	2024	2027	2029	2039	CXM	DX	7

QATO Tasks Tab

Tasks * denotes a required field

List of Tasks and unique Ids for each.

Run QATO | Back to Main Menu

ID*	Task	Include*	Type	Policy
T1	Task 1	1	Air	Offensive
T2	Task 2	1	Air	Offensive
T3	Task 3	1	Air	Offensive
T4	Task 4	1	Air	Offensive
T5	Task 5	1	Air	Offensive
T6	Task 6	1	Air	Offensive
T7	Task 7	1	Air	Offensive
T8	Task 8	1	Air	Offensive
T9	Task 9	1	Air	Offensive
T10	Task 10	1	Air	Offensive
T11	Task 11	1	Air	Offensive
T12	Task 12	1	Air	Offensive
T13	Task 13	1	Air	Offensive
T14	Task 14	1	Air	Offensive
T15	Task 15	1	Air	Defensive
T16	Task 16	1	Air	Defensive
T17	Task 17	1	Air	Defensive
T18	Task 18	1	Air	Defensive
T19	Task 19	1	Air	Defensive
T20	Task 20	1	Air	Defensive
T21	Task 21	1	Air	Defensive
T22	Task 22	1	Air	Defensive
T23	Task 23	1	Air	Defensive
T24	Task 24	1	Ground	Defensive
T25	Task 25	1	Ground	Defensive
T26	Task 26	1	Ground	Defensive
T27	Task 27	1	Ground	Defensive
T28	Task 28	1	Ground	Defensive
T29	Task 29	1	Ground	Defensive
T30	Task 30	1	Ground	Defensive
T31	Task 31	1	Ground	Defensive
T32	Task 32	1	Ground	Defensive
T33	Task 33	1	Ground	Defensive
T34	Task 34	1	Air	Offensive
T35	Task 35	1	Air	Offensive

QATO Budgets Tab

Budgets * denotes a required field

List of Budget schedules and unique Ids for each. Referenced to start year on systems sheet.

Run QATO | Back to Main Menu

ID*	Budget*	Include*	NumYears*	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
B1	Bob's	1	25	152.074	139.687	154.138	199.432	112.096	138.477	136.551	157.537	116.820	117.455	175.262
B2	Bill's	1	25	65.893	65.553	53.873	51.125	50.829	173.843	284.247	437.271	922.678	1219.601	1338.623
B3	Jim's	1	8	123.000	246.000	234.000	243.000	199.000	167.000	272.000	222.000	0.000	0.000	0.000

QATO Cost Schedules Tab

Cost Schedules * denotes a required field

List of Cost schedules and unique Ids for each. Referenced to start year on systems sheet.

Run QATO | Back to Main Menu

ID*	Cschedule	Include*	NumYears*	1	2	3	4	5	6	7	8	9	10
CA	1	1	25	75.000	122.000	265.000	385.000	210.000	185.000	106.000	45.000	24.000	24.000
CB	2	1	25	78.328	69.834	65.608	64.192	55.034	36.366	37.512	38.594	39.728	40.906
CC	3	1	25	27.500	62.500	62.500	67.500	72.500	120.000	147.500	175.000	202.500	230.000
CD	4	1	25	184.000	462.000	632.000	421.000	267.000	101.000	41.000	41.000	41.000	41.000
CE	5	1	25	35.021	62.041	23.333	3.448	20.748	20.748	20.748	20.748	20.748	6.897
CF	6	1	25	4.922	9.692	7.383	12.630	18.873	17.746	17.746	17.746	17.746	6.897
CFM	7	1	25	5.757	17.746	17.746	17.746	17.746	6.897	17.746	17.746	17.746	17.746
CG	8	1	25	58.377	58.523	44.962	41.101	38.583	38.583	38.583	38.583	38.583	38.583
CGM	9	1	25	3.937	35.433	35.433	3.937	3.937	3.937	3.937	35.433	35.433	3.937
CH	10	1	25	14.328	10.119	10.338	10.283	5.037	5.037	5.037	5.037	5.037	5.037
CI	11	1	25	8.033	7.483	7.663	7.686	7.686	7.686	7.686	7.686	7.686	7.686
CJ	12	1	25	19.947	19.205	23.511	23.931	18.909	18.909	18.909	18.909	18.909	18.909
CK	13	1	25	0.750	1.010	23.140	23.150	23.160	23.180	0.050	0.050	0.050	0.050
CL	14	1	25	75.000	80.000	82.500	82.500	82.500	85.000	85.000	85.000	85.000	28.750
CM	15	1	25	13.339	13.885	13.911	13.989	7.559	19.108	19.108	19.108	7.559	7.559
CMM	16	1	25	7.559	19.108	19.108	19.108	7.559	7.559	7.559	7.559	19.108	19.108
CN	17	1	25	9.475	22.429	16.320	19.790	19.790	19.790	8.790	8.790	8.790	19.790
CNM	18	1	25	4.604	16.320	19.790	19.790	19.790	19.790	8.790	8.790	19.790	19.790
CO	19	1	25	3.938	8.609	5.984	5.984	5.984	5.984	0.210	0.210	0.210	0.210
COM	20	1	25	5.984	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210
CP	21	1	25	11.564	29.568	78.176	113.743	279.118	355.763	346.882	458.516	481.215	538.367
CQ	22	1	25	112.868	154.635	216.652	211.780	161.436	106.271	98.455	98.455	88.965	88.965
CR	23	1	25	88.153	110.787	161.639	162.197	125.556	97.339	78.054	76.937	77.648	77.648
CS	24	1	25	144.232	236.495	274.253	272.578	203.355	179.960	178.843	178.843	178.995	149.560
CT	25	1	25	73.486	99.470	142.354	146.414	109.620	80.287	76.937	76.937	70.796	70.796

QATO Deployment Schedules Tab

Deployment Schedules * denotes a required field

List of Deployment schedules and unique Ids for each. Each schedule shows how fast a system comes on line by year. Referenced to start year on syste

Run QATO | Back to Main Menu

ID*	Dschedule	Include*	NumYears*	1	2	3	4	5	6	7	8	9	10
DA	1	1	1	1									
DB	2	1	8	0	0	0	0	0.25	0.5	0.75	1		
DC	3	1	9	0	0	0	0	0	0	0.33	0.66	1	
DD	4	1	10	0	0	0	0.18	0.18	0.36	0.5	0.65	0.8	1
DE	5	1	7	0	0	0	0.25	0.5	0.75	1			
DF	6	1	6	0	0	0.25	0.5	0.75	1				
DG	7	1	6	0	0	0	0	0.4	1				
DH	8	1	3	0	0.4	1							
DI	9	1	5	0	0	0	0	1					
DJ	10	1	4	0	0	0	1						
DK	11	1	4	0	0	0.5	1						
DL	12	1	9	0	0	0	0	0	0	0	0.6	1	
DM	13	1	4	0	0.33	0.66	1						
DN	14	1	3	0	0.33	1							
DO	15	1	6	0	0.2	0.4	0.6	0.8	1				
DP	16	1	4	0	0.4	0.8	1						
DQ	17	1	2	0	1								
DR	18	1	10	0	0	0	0	0.12	0.12	0.24	0.24	0.5	1
DS	19	1	10	0	0	0	0	0.1	0.3	0.5	0.7	0.8	1
DT	20	1	10	0	0	0	0	0.33	0.33	0.33	0.33	0.33	1
DU	21	1	6	0	0	0	0.5	0.8	1				
DV	22	1	6	0	0	0	0	0.8	1				
DW	23	1	9	0	0	0.15	0.3	0.45	0.6	0.75	0.9	1	
DX	24	1	6	0	0	0	0.33	0.66	1				

QATO Scores Tab

Scores1 * denotes a required field

Run QATO | Back to Main Menu

Score ID Table - Lookup by System and Task

System*	Task* T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
A	S1	S2											
B													
C							S31	S31				S31	
D		S3			S4						S4		
E							S91						
F					S65						S65		
F1					S65						S65		
F2					S65						S65		
G							S22	S23	S24			S22	
G1							S22	S23	S24			S22	
H	S4												
I			S4										
J		S15	S4										
K													
L													
M	S38												
M1	S16												
M2	S16												
N											S71		
N1											S71		
N2											S71		
O											S45		

QATO Scores Tab (continued)

Score Tables:

ID*	# of Tables*	2006-2011 Phase	2006-2011 Score	2012-2017 Phase	2012-2017 Score	2018-2030 Phase	2018-2030 Score
S1	3	0	0	0	0	0	0
		1	2	1	2	1	2
S2	3	0	0	0	0	0	0
		1	0	1	0	1	3
S3	3	0	0	0	0	0	0
		1	6	1	6	1	6
S4	3	0	0	0	0	0	0
		1	1	1	1	1	1
S5	3	0	0	0	0	0	0
		1	28	1	28	1	28
S6	3	0	0	0	0	0	0

QATO Output Tab

4	**Budget:**												
5	**ID**	**Budget**		**Total ($M)**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
6	B1	Bob's	Cost	19690.127	207.200	258.209	450.296	604.835	688.652	763.396	738.678	785.522	826.164	851.963
7			CBA	4367.918	152.074	139.687	154.138	199.432	112.096	138.477	136.551	157.537	116.820	117.455
8			Over/Under	-15322.209	-55.126	-118.522	-296.158	-405.403	-576.556	-624.919	-602.127	-627.985	-709.344	-734.508
9														
10	B2	Bill's	Cost	19520.99	255.716	545.432	701.897	486.624	350.328	274.839	362.759	497.229	604.325	749.261
11			CBA	30070.002	65.893	65.553	53.873	51.125	50.829	173.843	284.247	437.271	922.678	1219.601
12			Over/Under	10549.012	-189.823	-479.879	-648.024	-435.499	-299.499	-100.996	-78.512	-59.958	318.353	470.340
13														
14	B3	Jim's	Cost	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15			CBA	1706	123.000	246.000	234.000	243.000	199.000	167.000	272.000	222.000	0.000	0.000
16			Over/Under	1706	123.000	246.000	234.000	243.000	199.000	167.000	272.000	222.000	0.000	0.000
17														
18		Arch Cost		39211.117	462.916	803.641	1152.193	1091.459	1038.980	1038.235	1101.437	1282.751	1430.489	1601.224
19		Total CBA		36143.92	340.967	451.240	442.011	493.557	361.925	479.320	692.798	816.808	1039.498	1337.056
20		Total CBA Over/Under		-3067.197	-121.949	-352.401	-710.182	-597.902	-677.055	-558.915	-408.639	-465.943	-390.991	-264.168
21														
22														
23	**Scores:**													
24	**Task**	**System**			**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
25	T1	System 1			2	2	2	2	2	2	2	2	2	2
26		System 8							1	1	1	1	1	1
27		System 13					1	1	1	1				
28		System 13A												
29		System 13B												
30		System 16							10	10	19	19	40	80
31		System 19												
32		Summed Task Coverage			2	2	3	3	14	14	22	22	43	83
33		Max Score For Task			2	2	2	2	10	10	19	19	40	80
34														

QATO Budget Output Tab

1	**Detailed Budget Output**												
2													
3													
4													
5	**Budget**	**Type**	**System**	**Nomenclature**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
6	B1	A	System 1	AA001	75.000	122.000	265.000	385.000	210.000	185.000	106.000	45.000	24.000
7		A	System 2	AA002	78.328	69.834	65.608	64.192	55.034	36.366	37.512	38.594	39.728
8		A	System 8	AA008	14.328	10.119	10.338	10.283	5.037	5.037	5.037	5.037	5.037
9		A	System 16	AA016	11.564	29.568	78.176	113.743	279.118	355.763	346.882	458.516	481.215
10		A	System 17	AA017					112.868	154.635	216.652	211.780	161.436
11		A	System 18	AA018									88.153
12		A	System 19	AA019									
13		A	System 20	AA020									
14		A	System 21	AA021									
15				Sub Total B1 A	179.220	231.521	419.122	573.218	662.057	736.801	712.083	758.927	799.569
16													
17		B	System 9	AA009	8.033	7.483	7.663	7.686	7.686	7.686	7.686	7.686	7.686
18		B	System 10	AA010	19.947	19.205	23.511	23.931	18.909	18.909	18.909	18.909	18.909
19				Sub Total B1 B	27.980	26.688	31.174	31.617	26.595	26.595	26.595	26.595	26.595
20													
21													
22	B1			Cost	207.200	258.209	450.296	604.835	688.652	763.396	738.678	785.522	826.164
23				CBA	152.074	139.687	154.138	199.432	112.096	138.477	136.551	157.537	116.820
24				Over/Under	-55.126	-118.522	-296.158	-405.403	-576.556	-624.919	-602.127	-627.985	-709.344
25													
26													
27													
28													
29					**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
30	B2	A	System 3	AA003						27.500	62.500	62.500	67.500
31		A	System 4	AA004	184.000	462.000	632.000	421.000	267.000	101.000	41.000	41.000	41.000
32		A	System 5	AA005						35.021	62.041	23.333	3.448

QATO Hints Tab

Back to Main Menu

Provides hints for constructing the QATO data sheets
As of 11/13/03

1. Systems sheet - begin here to characterize a system.
   Be sure to fill in the "Budget ID", "Start", "Stop", "Cschedule ID", and "Dschedule ID".
   The "Budget ID", "Cschedule ID", and "Dschedule ID" are links to the Budgets, CostSchedules, and DeploymentSchedules sheets.
   Set the "Include" value to "1" for any system to be included on the Output sheet.
   Be certain to add to the "Score ID Table" any new Systems added to the Systems sheet

2. Tasks sheet - this one is self-explanatory, but remember to set the "Include" value to "1" for any task to be included on the Output sheet.
   NOTE: Any task to be included will require scoring data in the Scores sheet for any relevant System.
   Be certain to add to the "Score ID Table" any new Tasks added to the Tasks sheet

3. Budgets sheet - this one is self-explanatory, but remember to set the "Include" value to "1" for any budget to be included on the Output sheet.

4. CostSchedules sheet - this one is self-explanatory.
   NOTE: Remember to set the "Include" value to "1" for any cost schedule REFERENCED by the Systems sheet when a system is to be includec
   An error message indicating the affected row and column on the Systems sheet will display if the "Include" value is "0".

5. DeploymentSchedules sheet - this one is self-explanatory.
   NOTE: Remember to set the "Include" value to "1" for any deployment schedule REFERENCED by the Systems sheet when a system is to be i
   An error message indicating the affected row and column on the Systems sheet will display if the "Include" value is "0".

6. Scores sheet - this one is tricky.
   NOTE: There needs to be a scores table for EACH combination of System and Task for which scoring is desired on the Output sheet.
   Be certain to add to the "Score ID Table" any new Systems added to the Systems sheet or any new Tasks added to the Tasks sheet

QATO HAT Tab

1		AA001 System 1	AA002 System 2	AA003 System 3	AA004 System 4	AA005 System 5	AA006 System 6	A006M1 System 6A	A006M2 System 6B	AA07 System 7	AA007M1 System 7A	AA008 System 8	AA009 System 9	AA010 System 10	AA011 System 11	AA012 System 12	AA013 System 13	AA013M1 System 13A	AA013M2 System 13B	AA014 System 14	AA014M1 System 14A	AA014M2 System 14B	AA015 System 15	AA015M1 System 15A	AA015M2 System 15B	AA016 System 16	AA017 System 17	AA018 System 18
2	2006	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	2007	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2008	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	2009	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
6	2010	1	0	0	1	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
7	2011	1	0	0	1	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
8	2012	1	0	0	1	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
9	2013	1	1	0	1	0	0	0	0	1	0	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0
10	2014	1	1	0	1	0	0	0	0	1	0	1	1	1	1	0	1	1	0	0	0	0	1	0	0	0	0	0
11	2015	1	1	0	1	0	0	0	0	1	0	1	1	1	1	0	1	1	1	0	0	0	1	1	1	1	0	0
12	2016	0	1	0	1	0	0	0	0	1	1	1	1	1	1	0	1	1	1	0	0	0	1	1	1	1	0	0
13	2017	0	1	0	1	0	0	0	0	0	1	0	0	1	1	0	1	1	1	1	0	0	1	1	1	1	0	0
14	2018	0	1	0	1	0	1	0	0	0	1	0	0	1	1	0	1	1	1	1	0	0	1	1	1	1	0	0
15	2019	0	1	1	1	0	1	1	0	0	1	0	0	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0
16	2020	0	1	1	1	1	1	1	0	0	1	0	0	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0
17	2021	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	0
18	2022	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	0
19	2023	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	2024	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21	2025	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	2026	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
23	2027	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
24	2028	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25	2029	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
26	2030	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
27																												

What is QATO? (continued)

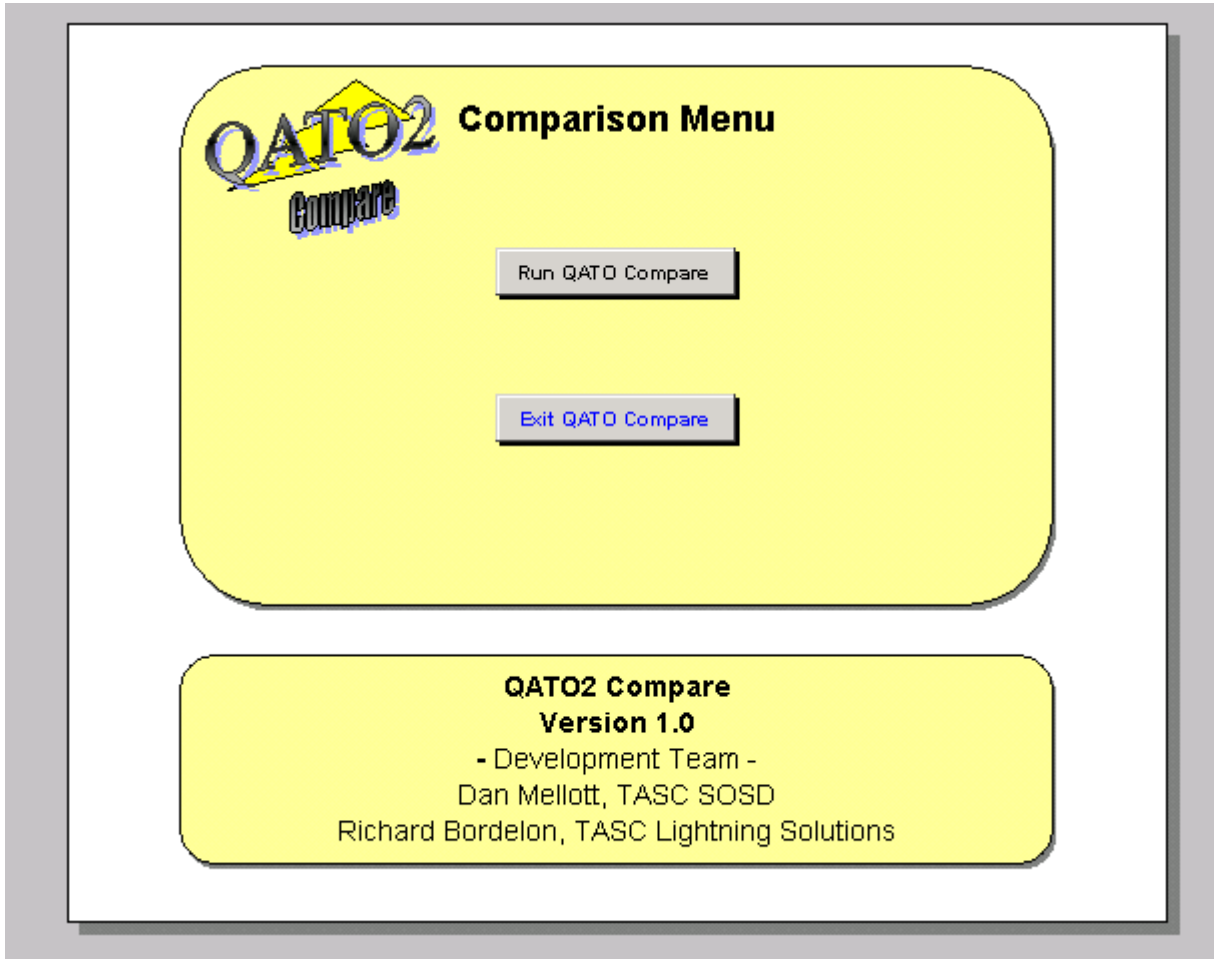
- **QATO Compare**
  - **QATO Compare is the second part of the QATO Suite, an automated roadmap comparison workbook**
    - **QATO Compare initially consists of one sheet, the Menu sheet**
    - **Copy the Output sheets from QATO runs into the QATO Compare workbook and push Run QATO Compare on the Menu sheet**
    - **QATO Compare then generates three additional sheets**
  - **Can compare from 2 to 20 roadmaps**

What is QATO? (continued)

- **Compare Budget: Compares the budgets of the roadmaps in relationship to Roadmap 1**
- **Compare Task Effectiveness: Compares the task effectiveness of the roadmaps in relationship to Roadmap 1**
- **Compare Task Percentage Change: Based upon the Compare Task Effectiveness sheet, this sheet gives you a quick glance at the percentage of change in the task effectiveness in relationship to Roadmap 1**

QATO2
Compare

QATO Compare Main Menu Tab



QATO Compare Architecture Output Tab

1	**Output**	12/30/2003											
2				Back to Main Menu									
3													
4	**Budget:**												
5	**ID**	**Budget**		**Total ($M)**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
6	B1	Bob's	Cost	14797.625	112.253	128.028	172.809	206.438	492.241	603.495	670.966	761.523	786.227	812.026
7			CBA	4367.918	152.074	139.687	154.138	199.432	112.096	138.477	136.551	157.537	116.820	117.455
8			Over/Under	-10429.707	39.821	11.659	-18.671	-7.006	-380.145	-465.018	-534.415	-603.986	-669.407	-694.571
9														
10	B2	Bill's	Cost	17338.189	0.000	0.000	0.000	0.000	0.750	63.531	193.328	272.354	288.489	359.737
11			CBA	30070.002	65.893	65.553	53.873	51.125	50.829	173.843	284.247	437.271	922.678	1219.601
12			Over/Under	12731.813	65.893	65.553	53.873	51.125	50.079	110.312	90.919	164.917	634.189	859.864
13														
14	B3	JT's	Cost	6497.202	103.339	638.885	77.599	78.887	11.497	27.717	25.092	86.274	208.189	287.651
15			CBA	1045	123.000	246.000	234.000	243.000	199.000	0.000	0.000	0.000	0.000	0.000
16			Over/Under	-5452.202	19.661	-392.885	156.401	164.113	187.503	-27.717	-25.092	-86.274	-208.189	-287.651
17														
18		Arch Cost		38633.016	215.592	766.913	250.408	285.325	504.488	694.743	889.386	1120.151	1282.905	1459.414
19		Total CBA		35482.92	340.967	451.240	442.011	493.557	361.925	312.320	420.798	594.808	1039.498	1337.056
20		Total CBA Over/Under		-3150.096	125.375	-315.673	191.603	208.232	-142.563	-382.423	-468.588	-525.343	-243.407	-122.358
21														
22														
23	**Scores:**													
24	**Task**	**System**			**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
25	TRGF	AA001			2	2	2	2	2	2	2	2	2	2
26		AA008							1	1	1	1	1	1
27		AA013					1	1	1	1				
28		AA013M2												
29		AA016							10	10	19	19	40	80
30		AA019												
31		AA027			28	28	28	28	28	28	28	28	28	28
32		Summed Task Coverage			30	30	31	31	42	42	50	50	71	111

QATO Compare
Compare Budget Tab

1	Compare Budget													
2														
3														
4	Budget:													
5	ID	Budget		Total ($M)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
6	B1	Bob's	Arch 1	14797.625	112.253	128.028	172.809	206.438	492.241	603.495	670.966	761.523	786.227	812.026	797.798
7			Arch 2	15906.529	112.253	117.004	161.785	195.904	459.743	559.487	613.769	721.613	907.255	809.054	931.826
8			Over/Unde	-1108.904	0.000	11.024	11.024	10.534	32.498	44.008	57.197	39.910	-121.028	2.972	-134.028
9															
10	B2	Bill's	Arch 1	17338.189	0.000	0.000	0.000	0.000	0.750	63.531	193.328	272.354	288.489	359.737	384.954
11			Arch 2	17286.523	58.377	58.523	44.962	41.101	39.333	102.114	231.911	235.937	241.315	298.074	323.291
12			Over/Unde	51.666	-58.377	-58.523	-44.962	-41.101	-38.583	-38.583	-38.583	36.417	47.174	61.663	61.663
13															
14	B3	JT's	Arch 1	6497.202	103.339	638.885	77.599	78.887	11.497	27.717	25.092	86.274	208.189	287.651	307.342
15			Arch 2	7146.357	123.286	658.090	101.110	102.818	30.406	46.626	51.560	124.291	246.206	325.668	333.810
16			Over/Unde	-649.155	-19.947	-19.205	-23.511	-23.931	-18.909	-18.909	-26.468	-38.017	-38.017	-38.017	-26.468
17															
18		Arch Cost	Arch 1	38633.016	215.592	766.913	250.408	285.325	504.488	694.743	889.386	1120.151	1282.905	1459.414	1490.094
19			Arch 2	40339.409	293.916	833.617	307.857	339.823	529.482	708.227	897.240	1081.841	1394.776	1432.796	1588.927
20			Over/Unde	-1706.393	-78.324	-66.704	-57.449	-54.498	-24.994	-13.484	-7.854	38.310	-111.871	26.618	-98.833

QATO Compare
Compare Task Effectiveness Tab

1	Compare Task Effectiveness																
2																	
3																	
4	Scores:																
5	Task	System	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
6	TRGF																	
7	Arch 1	Summed Task Coverage	30	30	31	31	42	42	50	50	71	111	111	110	110	110	110	110
8	Arch 2	Summed Task Coverage			1	1	12	12	20	20	41	81	81	80	80	80	80	80
9		Difference	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30
10		Percentage Change	-100.00%	-100.00%	-96.77%	-96.77%	-71.43%	-71.43%	-60.00%	-60.00%	-42.25%	-27.03%	-27.03%	-27.27%	-27.27%	-27.27%	-27.27%	-27.27%
11																		
12	TRGM																	
13	Arch 1	Summed Task Coverage	59	59	59	59	69	69	78	78	99	139	139	139	142	142	142	142
14	Arch 2	Summed Task Coverage	6	6	6	6	32	32	35	35	56	96	96	96	96	96	96	86
15		Difference	-53	-53	-53	-53	-37	-37	-43	-43	-43	-43	-43	-43	-46	-46	-46	-56
16		Percentage Change	-89.83%	-89.83%	-89.83%	-89.83%	-53.62%	-53.62%	-55.13%	-55.13%	-43.43%	-30.94%	-30.94%	-30.94%	-32.39%	-32.39%	-32.39%	-39.44%
17																		
18	TRGB																	
19	Arch 1	Summed Task Coverage	28	28	28	29	39	39	48	48	69	109	109	108	108	108	108	108
20	Arch 2	Summed Task Coverage				1	12	12	21	21	42	82	82	81	81	81	81	80
21		Difference	-28	-28	-28	-28	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-28
22		Percentage Change	-100.00%	-100.00%	-100.00%	-96.55%	-69.23%	-69.23%	-56.25%	-56.25%	-39.13%	-24.77%	-24.77%	-25.00%	-25.00%	-25.00%	-25.00%	-25.93%
23																		
24	TRNGF																	
25	Arch 1	Summed Task Coverage	22	22	93	93	93	93	28	28	28	53	67	77	77	77	77	77
26	Arch 2	Summed Task Coverage			71	71	71	71				25	110	120	191	191	191	262
27		Difference	-22	-22	-22	-22	-22	-22	-28	-28	-28	-28	43	43	114	114	114	185
28		Percentage Change	-100.00%	-100.00%	-23.66%	-23.66%	-23.66%	-23.66%	-100.00%	-100.00%	-100.00%	-52.83%	64.18%	55.84%	148.05%	148.05%	148.05%	240.26%
29																		
30	TRNGM																	
31	Arch 1	Summed Task Coverage	59	59	130	130	130	130	65	65	65	92	108	119	120	120	120	120
32	Arch 2	Summed Task Coverage	1	1	72	72	72	72	1	1	1	28	114	125	196	196	196	267
33		Difference	-58	-58	-58	-58	-58	-58	-64	-64	-64	-64	6	6	76	76	76	147
34		Percentage Change	-98.31%	-98.31%	-44.62%	-44.62%	-44.62%	-44.62%	-98.46%	-98.46%	-98.46%	-69.57%	5.56%	5.04%	63.33%	63.33%	63.33%	122.50%
35																		
36	TRHC																	
37	Arch 1	Summed Task Coverage													25	25	25	25
38	Arch 2	Summed Task Coverage													25	25	25	25
39		Difference																
40		Percentage Change	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
41																		

QATO Compare
Compare Task Percentage Change

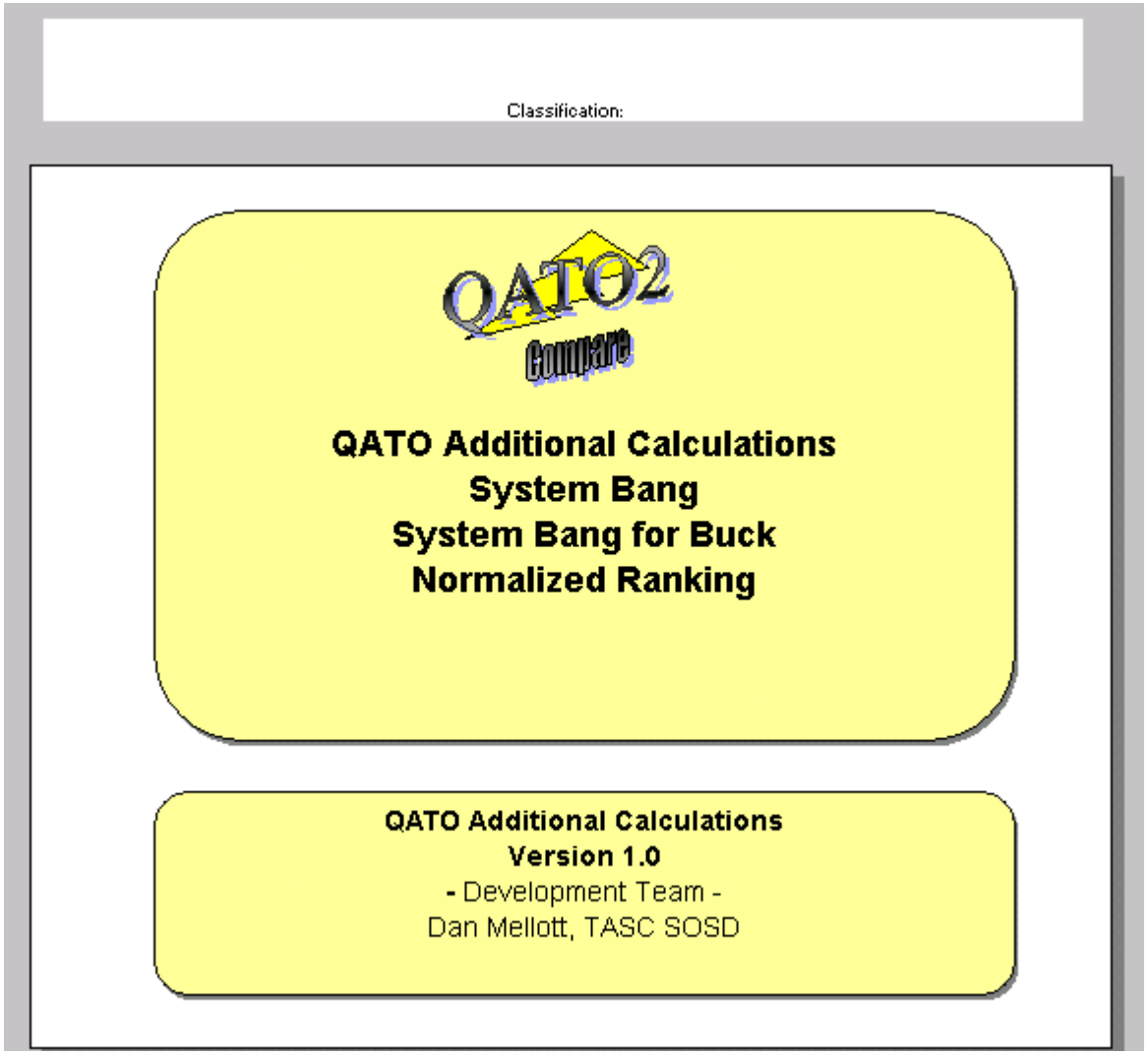
Compare Task Percentage Change																	
Scores:																	
Task		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
TRGF	Arch 1-Arch 2 Change	-100%	-100%	-97%	-97%	-71%	-71%	-60%	-60%	-42%	-27%	-27%	-27%	-27%	-27%	-27%	-27%	-22%
TRGM	Arch 1-Arch 2 Change	-90%	-90%	-90%	-90%	-54%	-54%	-55%	-55%	-43%	-31%	-31%	-31%	-32%	-32%	-32%	-39%	-33%
TRGB	Arch 1-Arch 2 Change	-100%	-100%	-100%	-97%	-69%	-69%	-56%	-56%	-39%	-25%	-25%	-25%	-25%	-25%	-25%	-26%	-21%
TRNGF	Arch 1-Arch 2 Change	-100%	-100%	-24%	-24%	-24%	-24%	-100%	-100%	-100%	-53%	64%	56%	148%	148%	148%	240%	240%
TRNGM	Arch 1-Arch 2 Change	-98%	-98%	-45%	-45%	-45%	-45%	-98%	-98%	-98%	-70%	6%	5%	63%	63%	63%	123%	123%
TRHC	Arch 1-Arch 2 Change	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TRPM	Arch 1-Arch 2 Change	0%	0%	0%	0%	4%	0%	-20%	-20%	-7%	-2%	60%	41%	74%	60%	55%	80%	78%
TRHS	Arch 1-Arch 2 Change	0%	0%	0%	0%	4%	4%	20%	20%	9%	2%	67%	44%	80%	65%	61%	88%	86%
TRSA	Arch 1-Arch 2 Change	0%	0%	0%	0%	8%	9%	80%	80%	36%	8%	66%	44%	85%	72%	67%	96%	93%
TRSP	Arch 1-Arch 2 Change	0%	0%	0%	0%	0%	-100%	-100%	-100%	-50%	-12%	60%	47%	90%	75%	70%	100%	97%
TRN	Arch 1-Arch 2 Change	1%	1%	1%	1%	1%	100%	50%	50%	50%	17%	0%	0%	-10%	-8%	-7%	-6%	-6%
TRNGV	Arch 1-Arch 2 Change	0%	0%	0%	0%	5%	-43%	-70%	-70%	-52%	-20%	-1%	-2%	12%	12%	12%	25%	25%
TRGV	Arch 1-Arch 2 Change	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TIGF	Arch 1-Arch 2 Change	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TIGM	Arch 1-Arch 2 Change	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TIGB	Arch 1-Arch 2 Change	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TINGF	Arch 1-Arch 2 Change	0%	0%	0%	0%	0%	0%	-26%	-21%	-21%	-9%	78%	66%	129%	113%	101%	139%	134%
TINGM	Arch 1-Arch 2 Change	0%	0%	0%	0%	0%	0%	-17%	-13%	-13%	-7%	65%	49%	84%	70%	65%	92%	90%

What is QATO? (continued)

- **QATO Additional Calculations**
  - **QATO Additional Calculations is the third part of the QATO Suite, an automated workbook that calculates bang-for-buck**
    - **QATO Additional Calculations initially consists of five sheets, the Cover sheet and empty (blank) Systems, Output, Budget Output, and Additional Calculations sheets**
    - **Copy the Systems, Output, and Budget Output sheets from QATO runs into the QATO Additional Calculations workbook and QATO Additional Calculations will automatically generate the additional calculations**
    - **Provides System Bang, System Bang-for-Buck, and Normalized System Scores**

QATO2
Additional Calculations

QATO Additional Calculations Cover Tab



QATO Additional Calculations
Systems Tab

Run QATO | Back to Main Menu

ID	System #	Include	Nomenclature	Type	Budget ID	Force	Start	IOC	FOC	Stop	Cschedule ID	Dschedule ID	TRL
A	System 1	1	AA001	A	B1	2	2006	2006	2006	2015	CA	DA	9
B	System 2	1	AA002	A	B1	7	2006	2010	2013	2030	CB	DB	9
C	System 3	1	AA003	A	B2	6	2011	2017	2019	2030	CC	DC	7
D	System 4	1	AA004	A	B2	10	2006	2006	2006	2030	CD	DA	9
E	System 5	1	AA005	A	B2	6	2011	2014	2020	2030	CE	DD	7
F	System 6	1	AA006	A	B2	6	2012	2015	2018	2030	CF	DE	7
F1	System 6A	1	AA006M1	A	B2	6	2014	2016	2019	2030	CFM	DF	7
F2	System 6B	1	AA006M2	A	B2	6	2026	2028	2031	2041	CFM	DF	7
G	System 7	1	AA07	A	B2	5	2006	2010	2011	2016	CG	DG	9
G1	System 7A	1	AA007M1	A	B2	5	2014	2015	2016	2030	CGM	DH	9
H	System 8	1	AA008	A	B1	1	2006	2010	2010	2016	CH	DI	9
I	System 9	1	AA009	B	B1	2	2006	2009	2009	2016	CI	DJ	9
J	System 10	1	AA010	B	B1	1	2006	2010	2010	2020	CJ	DI	9
K	System 11	1	AA011	B	B2	500	2010	2012	2013	2030	CK	DK	8
L	System 12	1	AA012	B	B2	1	2013	2020	2021	2030	CL	DL	7
M	System 13	1	AA013	A	B2	3	2006	2007	2009	2030	CM	DM	9
M1	System 13A	1	AA013M1	A	B2	3	2012	2012	2014	2030	CMM	DN	9
M2	System 13B	1	AA013M2	A	B2	3	2013	2013	2015	2030	CMM	DN	9
N	System 14	1	AA014	A	B2	25	2012	2013	2017	2030	CN	DO	7
N1	System 14A	1	AA014M1	A	B2	25	2016	2017	2019	2030	CNM	DO	7
N2	System 14B	1	AA014M2	A	B2	25	2020	2021	2023	2030	CNM	DO	7
O	System 15	1	AA015	B	B2	50000	2010	2011	2013	2030	CO	DP	8
O1	System 15A	1	AA015M1	B	B2	50000	2014	2015	2015	2030	COM	DQ	8
O2	System 15B	1	AA015M2	B	B2	50000	2014	2015	2015	2030	COM	DQ	8
P	System 16	1	AA016	A	B1	8	2006	2010	2015	2030	CP	DR	9
Q	System 17	1	AA017	A	B1	10	2010	2014	2019	2030	CQ	DS	8
R	System 18	1	AA018	A	B1	10	2014	2018	2023	2030	CR	DS	6
S	System 19	1	AA019	A	B1	3	2018	2022	2027	2030	CS	DT	5
T	System 20	1	AA020	A	B1	10	2022	2026	2031	2036	CT	DS	4
U	System 21	1	AA021	A	B1	10	2026	2030	2035	2045	CU	DS	3
V	System 22	1	AA022	A	B2	4	2012	2015	2017	2030	CV	DU	7
W	System 23	1	AA023	B	B2	1	2007	2011	2012	2030	CW	DV	9
X	System 24	1	AA024	B	B2	30	2013	2015	2021	2031	CX	DW	7
X1	System 24A	1	AA024M1	B	B2	30	2019	2022	2024	2034	CXM	DX	7
X2	System 24B	1	AA024M2	B	B2	30	2022	2025	2027	2037	CXM	DX	7
X3	System 24C	1	AA024M3	B	B2	30	2024	2027	2029	2039	CXM	DX	7

QATO Additional Calculations Output Tab

1	**Output**	**6/11/2004**																
2				Back to Main Menu														
3																		
4	**Budget:**																	
5	**ID**	**Budget**		**Total ($M**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
6	B1	Bob's	Cost	19738.127	86.564	151.568	463.812	605.384	596.238	646.855	652.416	726.149	791.011	844.373	826.164	796.834	810.619	832.594	817.672
7			CBA	4305.36	152.074	139.687	154.138	199.432	112.096	138.477	136.551	157.537	116.820	117.455	175.262	152.035	243.833	98.288	75.018
8			Over/Under	-15432.767	65.510	-11.881	-309.674	-405.952	-484.142	-508.378	-515.865	-568.612	-674.191	-726.918	-650.902	-644.799	-566.786	-734.306	-742.654
9																			
10	B2	Bill's	Cost	19598.156	71.716	72.408	242.873	528.114	689.166	489.225	361.877	274.839	351.210	485.680	604.325	749.261	794.169	692.897	789.678
11			CBA	30238.721	65.893	65.553	53.873	51.125	50.829	173.843	284.247	437.271	922.678	1219.601	1338.623	1315.630	1270.652	1289.980	1439.796
12			Over/Under	10640.565	-5.823	-6.855	-189.000	-476.989	-638.337	-315.382	-77.630	162.432	571.468	733.921	734.298	566.369	476.483	597.083	650.118
13																			
14	B3	Jim's	Cost	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15			CBA	1706	123.000	246.000	234.000	243.000	199.000	167.000	272.000	222.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16			Over/Under	1706	123.000	246.000	234.000	243.000	199.000	167.000	272.000	222.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17																			
18		Arch Cost		39336.283	158.280	223.976	706.685	1133.498	1285.404	1136.080	1014.293	1000.988	1142.221	1330.053	1430.489	1546.095	1604.788	1525.491	1607.350
19		Total CBA		36250.081	340.967	451.240	442.011	493.557	361.925	479.320	692.798	816.808	1039.498	1337.056	1513.885	1467.665	1514.485	1388.268	1514.814
20		Total CBA Over/Under		-3086.202	182.687	227.264	-264.674	-639.941	-923.479	-656.760	-321.495	-184.180	-102.723	7.003	83.396	-78.430	-90.303	-137.223	-92.536
21																			
22																			
23	**Scores:**																		
24	**Task**	**System**			**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
25	T1	System 1			2	2	2	2	2	2	2	2	2	2	2	2			
26		System 8									1	1	1	1	1	1	1		
27		System 13					1	1	1	1	1	1							
28		System 13A																	
29		System 13B																	
30		System 16							10	10	19	19	40	80	80	80	80	80	80
31		System 19																	
32		Summed Task Coverage			2	2	3	3	13	13	23	23	43	83	83	83	81	80	80
33		Max Score For Task			2	2	2	2	10	10	19	19	40	80	80	80	80	80	80
34																			
35	T2	System 1																	
36		System 4					6	6	6	6	6	6	6	6	6	6	6	6	6
37		System 10									16	16	10	10	10	10	10	10	10
38		System 16							10	10	19	19	40	80	80	80	80	80	80
39		System 19																	
40		Summed Task Coverage					6	6	16	16	41	41	56	96	96	96	96	96	96
41		Max Score For Task					6	6	10	10	19	19	40	80	80	80	80	80	80
42																			

QATO Additional Calculations
Budget Output Tab

1	**Detailed Budget Output**																
2																	
3																	
4																	
5	**Budget**	**Type**	**System**	**Nomenclature**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
6	B1	A	System 1	AA001	75.000	122.000	265.000	385.000	210.000	185.000	106.000	45.000	24.000	24.000	24.000	24.000		
7		A	System 2	AA002			78.328	69.834	65.608	64.192	55.034	36.366	37.512	38.594	39.728	40.906	42.176	21.330
8		A	System 8	AA008			14.328	10.119	10.338	10.283	5.037	5.037	5.037	5.037	5.037	5.037	5.037	
9		A	System 16	AA016	11.564	29.568	78.176	113.743	279.118	355.763	346.882	458.516	481.215	538.367	481.215	483.238	478.099	531.703
10		A	System 17	AA017							112.868	154.635	216.652	211.780	161.436	106.271	98.455	98.455
11		A	System 18	AA018											88.153	110.787	161.639	162.197
12		A	System 19	AA019														
13		A	System 20	AA020														
14		A	System 21	AA021														
15				Sub Total B1 A	86.564	151.568	435.832	578.696	565.064	615.238	625.821	699.554	764.416	817.778	799.569	770.239	785.406	813.685
16																		
17		B	System 9	AA009			8.033	7.483	7.663	7.686	7.686	7.686	7.686	7.686	7.686	7.686	6.304	
18		B	System 10	AA010			19.947	19.205	23.511	23.931	18.909	18.909	18.909	18.909	18.909	18.909	18.909	18.909
19				Sub Total B1 B	0.000	0.000	27.980	26.688	31.174	31.617	26.595	26.595	26.595	26.595	26.595	26.595	25.213	18.909
20																		
21																		
22	B1			Cost	86.564	151.568	463.812	605.384	596.238	646.855	652.416	726.149	791.011	844.373	826.164	796.834	810.619	832.594
23				CBA	152.074	139.687	154.138	199.432	112.096	138.477	136.551	157.537	116.820	117.455	175.262	152.035	243.833	98.288
24				Over/Under	65.510	-11.881	-309.674	-405.952	-484.142	-508.378	-515.865	-568.612	-674.191	-726.918	-650.902	-644.799	-566.786	-734.306
25																		
26																		
27																		
28																		
29					**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
30	B2	A	System 3	AA003								27.500	62.500	62.500	67.500	72.500	120.000	147.500
31		A	System 4	AA004			184.000	462.000	632.000	421.000	267.000	101.000	41.000	41.000	41.000	41.000	41.000	41.000
32		A	System 5	AA005								35.021	62.041	23.333	3.448	20.748	20.748	20.748
33		A	System 6	AA006									4.922	9.692	7.383	12.630	18.873	17.746
34		A	System 6A	AA006M1											5.757	17.746	17.746	17.746
35		A	System 6B	AA006M2														
36		A	System 7	AA07	58.377	58.523	44.962	41.101	38.583	38.583	38.583	38.583	38.583	38.583	38.583	38.583	38.583	
37		A	System 7A	AA007M1											3.937	35.433	35.433	3.937
38		A	System 13	AA013	13.339	13.885	13.911	13.989	7.559	19.108	19.108	19.108	7.559	7.559	7.559	7.559	19.108	19.108
39		A	System 13A	AA013M1									7.559	19.108	19.108	19.108	7.559	7.559
40		A	System 13B	AA013M2										7.559	19.108	19.108	19.108	7.559
41		A	System 14	AA014									9.475	22.429	16.320	19.790	19.790	19.790

QATO Additional Calculations
Additional Calculations Tab

	A	B	C	D	E	F	G	H	I	J	K	L
1		Total	Total		Now Term (2004-2007)		Near Term (2008-2013)		Mid Term (2014-2019)		Far Term (2020-2028)	
2		Normalized	Normalized		Normalized	Normalized	Normalized	Normalized	Normalized	Normalized	Normalized	Normalized
3	SYSTEM	Score	RAW	TRL	Score	Raw Score	Score	Raw Score	Score	Raw Score	Score	Raw Score
4	System 1	46.96	100.44	9	46.32	121.07	42.47	100.96	48.12	100.21	0.00	0.00
5	System 2	80.78	172.79	9	0.00	0.00	100.00	237.73	66.78	139.08	85.83	169.59
6	System 3	62.33	133.33	7	0.00	0.00	0.00	0.00	55.64	115.86	63.29	125.06
7	System 4	47.24	101.05	9	68.69	179.55	43.33	103.01	48.32	100.62	51.03	100.82
8	System 5	68.80	147.16	7	0.00	0.00	0.00	0.00	48.16	100.30	80.67	159.40
9	System 6	37.57	80.35	7	0.00	0.00	0.00	0.00	38.13	79.41	40.67	80.35
10	System 6A	37.62	80.47	7	0.00	0.00	0.00	0.00	38.27	79.70	40.73	80.48
11	System 6B	40.04	85.64	7	0.00	0.00	0.00	0.00	0.00	0.00	43.13	85.22
12	System 7	50.07	107.10	9	0.00	0.00	47.82	113.69	49.42	102.92	0.00	0.00
13	System 7A	54.79	117.20	9	0.00	0.00	0.00	0.00	54.09	112.64	59.04	116.66
14	System 8	48.18	103.06	9	0.00	0.00	44.19	105.06	48.50	101.00	0.00	0.00
15	System 9	47.67	101.97	9	0.00	0.00	43.56	103.56	48.33	100.64	0.00	0.00
16	System 10	51.56	110.28	9	0.00	0.00	54.68	129.99	49.70	103.50	54.96	108.60
17	System 11	51.77	110.74	8	0.00	0.00	56.40	134.08	46.24	96.30	55.68	110.02
18	System 12	39.91	85.36	7	0.00	0.00	0.00	0.00	0.00	0.00	42.72	84.42
19	System 13	50.01	106.97	9	100.00	261.38	52.20	124.09	49.71	103.51	53.90	106.50
20	System 13A	51.20	109.51	9	0.00	0.00	55.53	132.00	51.56	107.38	55.28	109.24
21	System 13B	51.58	110.34	9	0.00	0.00	0.00	0.00	51.41	107.05	55.72	110.09
22	System 14	36.66	78.41	7	0.00	0.00	0.00	0.00	37.56	78.22	39.66	78.36
23	System 14A	36.73	78.56	7	0.00	0.00	0.00	0.00	37.77	78.65	39.73	78.50
24	System 14B	36.93	78.98	7	0.00	0.00	0.00	0.00	0.00	0.00	39.93	78.91
25	System 15	45.32	96.93	8	0.00	0.00	43.48	103.37	44.02	91.67	48.95	96.71
26	System 15A	58.42	124.97	8	0.00	0.00	0.00	0.00	49.63	103.36	62.32	123.14
27	System 15B	58.42	124.97	8	0.00	0.00	0.00	0.00	49.63	103.36	62.32	123.14
28	System 16	65.16	139.38	9	0.00	0.00	75.05	178.42	65.99	137.42	66.86	132.12
29	System 17	68.40	146.30	8	0.00	0.00	0.00	0.00	53.76	111.95	73.84	145.90
30	System 18	73.16	156.48	6	0.00	0.00	0.00	0.00	39.64	82.54	78.51	155.13
31	System 19	47.68	101.98	5	0.00	0.00	0.00	0.00	0.00	0.00	47.10	93.06
32	System 20	31.03	66.36	4	0.00	0.00	0.00	0.00	0.00	0.00	32.34	63.91
33	System 21	0.00	0.00	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	System 22	100.00	213.90	7	0.00	0.00	0.00	0.00	100.00	208.25	100.00	197.59
35	System 23	67.06	143.44	9	0.00	0.00	87.90	208.96	58.88	122.61	71.21	140.70
36	System 24	41.76	89.33	7	0.00	0.00	0.00	0.00	39.42	82.10	45.12	89.15
37	System 24A	45.32	96.94	7	0.00	0.00	0.00	0.00	0.00	0.00	47.88	94.61
38	System 24B	48.55	103.84	7	0.00	0.00	0.00	0.00	0.00	0.00	51.29	101.34
39	System 24C	44.87	95.97	7	0.00	0.00	0.00	0.00	0.00	0.00	47.71	94.28

QATO Additional Calculations
Additional Calculations Tab (continued)

		SYSTEM BANG				SYSTEM BANG FOR BUCK					SYSTEM SUMMED TASK EFFECTIVENE														
	SYSTEM	NEAR	MID	FAR	TOTAL	NOV	NEAR	MID	FAR	TOTAL	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
4	System 1	6.00	6.00	0.00	6.00	0.0071	0.0042	0.0040	0.0000	0.0040	6	6	6	6	6	6	6	6	6	6	6	6	0	0	0
5	System 2	427.00	680.00	680.00	626.74	0.0000	0.9585	1.0755	0.8250	0.7604	0	0	0	0	0	0	174	346	508	680	680	680	680	680	680
6	System 3	0.00	857.33	1292.00	1183.33	0.0000	0.0000	0.9145	0.4545	0.4163	0	0	0	0	0	0	0	0	0	0	0	0	0	422	858
7	System 4	22.00	22.00	22.00	22.00	0.0341	0.0102	0.0092	0.0080	0.0080	0	0	22	22	22	22	22	22	22	22	22	22	22	22	22
8	System 5	0.00	175.00	394.00	306.40	0.0000	0.0000	0.7690	1.0191	0.7925	0	0	0	0	0	0	0	0	0	0	70	70	142	200	254
9	System 6	0.00	6.40	8.00	7.43	0.0000	0.0000	0.0600	0.0327	0.0304	0	0	0	0	0	0	0	0	0	0	0	4	4	8	8
10	System 6A	0.00	6.00	8.00	7.38	0.0000	0.0000	0.0717	0.0344	0.0318	0	0	0	0	0	0	0	0	0	0	0	0	4	4	8
11	System 6B	0.00	0.00	4.00	4.00	0.0000	0.0000	0.0000	0.0970	0.0970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	System 7	41.67	46.00	0.00	43.11	0.0000	0.0959	0.0836	0.0000	0.0784	0	0	0	0	20	46	46	46	46	46	46	46	46	0	0
13	System 7A	0.00	40.80	46.00	44.14	0.0000	0.0000	0.4711	0.2124	0.2039	0	0	0	0	0	0	0	0	0	0	0	20	46	46	46
14	System 8	3.00	3.00	0.00	3.00	0.0000	0.0460	0.0373	0.0000	0.0373	0	0	0	0	0	0	3	3	3	3	3	3	3	0	0
15	System 9	2.00	2.00	0.00	2.00	0.0000	0.0325	0.0240	0.0000	0.0240	0	0	0	0	0	2	2	2	2	2	2	2	2	0	0
16	System 10	41.00	32.00	32.00	35.27	0.0000	0.2527	0.1161	0.1086	0.1197	0	0	0	0	0	0	50	50	32	32	32	32	32	32	32
17	System 11	20.00	26.00	26.00	25.29	0.0000	0.4162	0.2749	0.2736	0.2661	0	0	0	0	0	0	0	0	14	26	26	26	26	26	26
18	System 12	0.00	0.00	70.67	70.67	0.0000	0.0000	0.0000	0.0780	0.0780	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	System 13	28.00	26.00	26.00	25.67	0.3507	0.2072	0.1209	0.0818	0.0808	0	8	21	29	29	29	29	29	26	26	26	26	26	26	26
20	System 13A	8.00	26.00	26.00	24.88	0.0000	0.3000	0.2733	0.1177	0.1126	0	0	0	0	0	0	0	0	0	8	26	26	26	26	26
21	System 13B	0.00	23.00	26.00	24.80	0.0000	0.0000	0.2627	0.1288	0.1229	0	0	0	0	0	0	0	0	0	0	8	26	26	26	26
22	System 14	0.00	2.00	2.00	2.00	0.0000	0.0000	0.0160	0.0074	0.0074	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2
23	System 14A	0.00	2.00	2.00	2.00	0.0000	0.0000	0.0331	0.0092	0.0092	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	System 14B	0.00	0.00	2.00	2.00	0.0000	0.0000	0.0000	0.0146	0.0146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	System 15	3.33	4.00	4.00	3.89	0.0000	0.1360	0.1072	0.1020	0.0992	0	0	0	0	0	0	0	2	4	4	4	4	4	4	4
26	System 15A	0.00	4.00	4.00	4.00	0.0000	0.0000	0.5687	0.4482	0.4482	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4
27	System 15B	0.00	4.00	4.00	4.00	0.0000	0.0000	0.5687	0.4482	0.4482	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4
28	System 16	617.00	1700.00	1700.00	1390.57	0.0000	0.2291	0.3091	0.2038	0.1667	0	0	0	0	194	194	382	382	850	1700	1700	1700	1700	1700	1700
29	System 17	0.00	634.67	1120.00	925.87	0.0000	0.0000	0.4742	0.6040	0.4993	0	0	0	0	0	0	0	0	0	0	112	336	560	784	896
30	System 18	0.00	309.00	1343.78	1155.64	0.0000	0.0000	0.4144	0.9876	0.8493	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158
31	System 19	0.00	0.00	824.29	824.29	0.0000	0.0000	0.0000	0.3862	0.3862	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	System 20	0.00	0.00	170.00	170.00	0.0000	0.0000	0.0000	0.2333	0.2333	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	System 21	0.00	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	System 22	0.00	1750.80	2034.00	1932.86	0.0000	0.0000	3.9477	1.3101	1.2450	0	0	0	0	0	0	0	0	0	0	0	1024	1628	2034	2034
35	System 23	183.33	220.00	220.00	213.89	0.0000	0.8891	0.7416	0.5051	0.4911	0	0	0	0	0	0	0	110	220	220	220	220	220	220	220
36	System 24	0.00	128.40	282.89	227.71	0.0000	0.0000	0.0824	0.1128	0.0908	0	0	0	0	0	0	0	0	0	0	0	44	88	126	170
37	System 24A	0.00	0.00	171.14	171.14	0.0000	0.0000	0.0000	0.1987	0.1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	System 24B	0.00	0.00	149.50	149.50	0.0000	0.0000	0.0000	0.2897	0.2897	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	System 24C	0.00	0.00	99.00	99.00	0.0000	0.0000	0.0000	0.2035	0.2035	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Conclusion - More Than Just a Planning Tool

- **QATO 2.2 can be used for POM support, AoAs, cut drills, operational impact analyses**
  - **Provides the contextual framework for any individual component of the roadmap**
  - **POM Support - Using QATO 2.2 now to run roadmap excursions, providing insight to roadmap task effectiveness and cost for decision makers**
  - **AoAs - Would be useful to develop and compare the best mix of systems and impact to overall roadmap**
  - **Cut Drills/ Operational Impact Analysis - Provide answers to decision makers when cutting systems or budget and the impact on the roadmap task effectiveness - capability to make on the fly changes**
- **Can be quickly adapted to suit your needs**

QUESTIONS?

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